1982 Contents

January

Kalman Filter Models for Network Forecasting 1
C. D. Pack and B. A. Whitaker

A Robust Sequential Projection Algorithm for Traffic Load Forecasting 15
J. P. Moreland

A Sequential Projection Algorithm for Special-Services Demand 39
A. Ionescu-Graff

A Short-Term Forecasting Algorithm for Trunk Demand Servicing 67
C. R. Szelag

Fast Recursive Estimation Using the Lattice Structure 97
E. Shichor

Contributors to This Issue 117

Papers by Bell Laboratories Authors 119

Contents, February Issue 121

February

Effects of Day-to-Day Load Variation on Trunk Group Blocking 123
A. Kashper, S. M. Rocklin, and C. R. Szelag

The Continuing Evolution of the Military Standard 105D Sampling System 137
B. S. Liebesman

Expansions for Nonlinear Systems 159
I. W. Sandberg

Volterra Expansions for Time-Varying Nonlinear Systems 201
I. W. Sandberg

An Approximate Thermal Model for Outdoor Electronics Cabinets 227
J. C. Coyne

Fail-Safe Nodes for Lightguide Digital Networks 247
A. Albanese

Contributors to This Issue 257

Papers by Bell Laboratories Authors 259

Contents, March Issue 261

B.S.T.J. Brief: 262
Fabrication and Properties of Single-Mode Optical Fiber Exhibiting Low Dispersion, Low Loss, and Tight Mode Confinement Simultaneously
A. D. Pearson, P. D. Lazay, and W. A. Reed

March

Video Colorization Diagnostics in Optical Telecommunications 267
H. M. Presby and R. Chang

Measurements of OH Diffusion in Optical-Fiber Cores 283
D. L. Philen

A Class of Approximations for the Waiting Time Distribution in a *GI/G/1* Queueing System 295
A. A. Fredericks

A General Class of Zero- or Minimum-Delay Fractional Rate Change Circuits 327
S. V. Ahamed

Peak Signal-to-Noise Formulas for Multistage Delta Modulation with RC-Shaped Gaussian Input Signals 347
R. Steele

Note on Some Factors Affecting Performance of Dynamic Time Warping Algorithms for Isolated Word Recognition 363
L. R. Rabiner

Letter to the Editor 375

Contributors to This Issue 377

Papers by Bell Laboratories Authors 379

Contents, April Issue 383

B.S.T.J. Brief: 385
Experimental Verification of Ultra-Wide Bandwidth Spectra in Double-Clad Single-Mode Fiber
S. J. Jang, L. G. Cohen, W. L. Mammel, and M. A. Saifi

April

NO. 10A REMOTE SWITCHING SYSTEM

R. W. Downing, Guest Editor

System Overview 391
N. B. Abbott, K. J. S. Chadha, D. P. Smith, and T. F. Wickham

Control-Complex Architecture and Circuit Design 419
R. K. Nichols and T. J. J. Starr

Peripheral Systems Architecture and Circuit Design 451
J. M. Adrian, L. Freimanis, and R. G. Sparber

Host Software 491
D. W. Brown, J. J. Driscoll, and F. M. Lax

Physical Design 525
C. E. Jeschke, A. E. Kranenborg, and B. S. Thakkar

Remote Terminal Firmware 565
D. A. Anderson, D. R. Fuller, D. R. Hanson, and R. B. Schmidt

System Maintenance 597
F. H. Keeve, J. C. Martin, and T. L. McRoberts

Transmission Plan 627
P. N. Burgess, J. L. Neigh, and R. G. Sparber

Contributors to This Issue 647

Papers by Bell Laboratories Authors 653

Contents, May–June Issue 659

May–June

Integral Representations and Asymptotic Expansions for Closed Markovian Queueing Networks: Normal Usage 661
J. McKenna and D. Mitra

Parasitic Insensitive, Biphase Switched Capacitor Filters Realized With One Operational Amplifier Per Pole Pair 685
K. R. Laker, P. E. Fleischer, and A. Ganesan

Moment Formulae for a Class of Mixed Multi-Job-Type Queueing Networks 709
H. Heffes

Adaptive Intra-Interframe DPCM Coder 747
P. Pirsch

Human Performance Engineering Considerations for Very Large Computer-Based Systems: The End User 765
I. S. Yavelberg

Graphic Displays of Combined Presentations of Acoustic and Articulatory Information 799
J. E. Miller and O. Fujimura

1A VOICE STORAGE SYSTEM

Voice Storage in the Network—Perspective and History 811
E. Nussbaum

Prologue 815
G. D. Bergland, W. T. Hartwell, and G. W. Smith, Jr.

New Custom Calling Services 821
D. P. Worrall

Architecture and Physical Design 841
R. G. Cornell and J. V. Smith

Software 863
G. W. Gates, R. F. Kranzmann, and L. D. Whitehead

Office Engineering, Maintenance, and Reliability 885
P. W. Bowman, J. C. Kennedy, and G. A. Van Dine

Acronyms and Abbreviations 913

Contributors to This Issue 915

Papers by Bell Laboratories Authors 923

Contents, July–August Issue 929

B.S.T.J. Brief: 931
A Josephson Parallel Multiplier
T. A. Fulton and L. N. Dunkleberger

July–August, Part 1

Electromagnetic Propagation in Homogeneous Media With Hermitian Permeability and Permittivity 935
E. E. Bergmann

A Primal Algorithm for Finding Minimum-Cost Flows in Capacitated Networks With Applications 949
C. L. Monma and M. Segal

Improved Reconstruction of DPCM-Coded Pictures 969
A. N. Netravali and E. G. Bowen

An Improved Training Procedure for Connected-Digit Recognition 981
L. R. Rabiner, A. Bergh, and J. G. Wilpon

Simulation and Design Studies of Digital Subscriber Lines 1003
S. V. Ahamed

Contributors to This Issue 1079

Papers by Bell Laboratories Authors 1083

Contents, September Issue 1093

July–August, Part 2

AUTOMATED REPAIR SERVICE BUREAU

Preface 1095
L. Schenker and S. J. Barbera

Evolution 1097
P. S. Boggs, M. W. Bowker, E. A. Overstreet, and R. W. Vetter, Jr.

System Architecture 1115
R. L. Martin

Data Base System 1131
C. M. Franklin and J. F. Vogler

The Trouble Report Evaluation and Analysis Tool 1153
S. P. Rhodes and L. S. Dickert

The Front-End System 1165
S. G. Chappell, F. H. Henig, and D. S. Watson

Software Tools and Components 1177
R. F. Bergeron and M. J. Rochkind

The Context-Sensitive Switch of the Loop Maintenance Operations System 1197
J. P. Holtman

Mechanized Loop Testing Strategies and Techniques 1209
F. J. Uhrhane

Mechanized Loop Testing Design 1235
O. B. Dale, T. W. Robinson, and E. J. Theriot

Second-Generation Mechanized Loop Testing System—A Distributed Microprocessor Application 1257
H. Rubin

Cable Repair Administrative System 1275
P. S. Boggs and J. R. Mashey

Human Performance Design Techniques 1293
G. H. Leonard and J. E. Zielinski

Two Examples of Human Performance Analysis and Design in Planning the ARSB 1301
R. F. Gauthier and W. A. Harris

On-Line Documentation: Mechanizing Development, Delivery, and Use 1313
R. J. Glushko and M. H. Bianchi

Economic Evaluation 1325
E. A. Overstreet

Acronyms and Abbreviations 1345

Contributors to This Issue 1349

September, Part 1

Wideband, Bidirectional, Lightguide Communication With an Optically Powered Audio Channel 1359
R. C. Miller, B. C. De Loach, T. S. Stakelon, and R. B. Lawry

Equalization of Multimode Optical Fiber Systems 1367
B. L. Kasper

Frequency-Hopped Single-Sideband Modulation for Mobile Radio 1389
V. K. Prabhu and R. Steele

Description of Fasnet—A Unidirectional Local-Area Communications Network 1413
J. O. Limb and C. Flores

On the Distribution Function and Moments of Power Sums With Log-Normal Components 1441
S. C. Schwartz and Y. S. Yeh

Piecewise Linear Approximation of Multivariate Functions 1463
G. S. Lee

A Traffic Overflow System With a Large Primary Queue 1487
J. A. Morrison and P. E. Wright

Memoryless Nonlinearities With Gaussian Inputs: Elementary Results 1519
H. E. Rowe

A Variation on CSMA/CD That Yields Movable TDM Slots in Integrated Voice/Data Local Networks 1527
N. F. Maxemchuk

Contributors to This Issue 1551

Papers by Bell Laboratories Authors 1555

Contents, October Issue 1565

B.S.T.J. Brief: 1567
Low-Elevation-Angle Propagation Effects on COMSTAR Satellite Signals
J. M. Titus and H. W. Arnold

September, Part 3

STORED PROGRAM CONTROLLED NETWORK

P. K. Bohacek, Guest Editor

Prologue 1575
F. T. Andrews, Jr. and K. E. Martersteck

Overview 1579
S. Horing, J. Z. Menard, R. E. Staehler, and B. J. Yokelson

Generic Network Plan 1589
J. J. Lawser, R. E. LeCronier, and R. L. Simms

Routing of Direct-Signaling Messages in the CCIS Network 1599
R. F. Frerking and M. A. McGrew

No. 1/1A ESS—SPC Network Capabilities and Signaling Architecture 1611
L. J. Gawron, S. J. Lueders, and K. L. Moeller

CCIS and SPC Network Performance 1637
E. A. Davis, C. J. Funk, and J. M. Sebeson

Calling Card Service—Overall Description and Operational Characteristics 1655
R. G. Basinger, M. Berger, E. M. Prell, V. L. Ransom, and J. R. Williams

Calling Card Service—TSPS Hardware, Software, and Signaling Implementation 1675
D. E. Confalone, B. W. Rogers, and R. J. Thornberry, Jr.

Calling Card Service—Human Factors Studies 1715
D. J. Eigen and E. A. Youngs

800 Service Using SPC Network Capability 1737
S. Sheinbein and R. P. Weber

800 Service Using SPC Network Capability—Network Implementation and Administrative Functions 1745
C. W. Haas, D. C. Salerno, and D. Sheinbein

Data Base Administration System—Overall Description and Operational Characteristics 1759
R. G. Barrere, J. P. Delatore, J. W. Lurtz, R. J. Piereth, and C. M. Rubald

Data Base Administration System—Architecture and Data Base Design 1779
S. F. Sampson and D. W. Tietz

Acronyms and Abbreviations 1799

Contributors to This Issue 1805

October

The Tap-Leakage Algorithm: An Algorithm for the Stable Operation of a Digitally Implemented, Fractionally Spaced, Adaptive Equalizer 1817
R. D. Gitlin, H. C. Meadors, and S. B. Weinstein

Using Magnetic Bubble Memories to Provide Recorded Announcements 1841
J. E. Rowley and J. Bernardini

Application of Graph Theory to the Solution of a Nonlinear Optimal Assignment Problem 1863
M. Malek-Zavarei

Stochastic Theory of a Data-Handling System With Multiple Sources 1871
D. Anick, D. Mitra, and M. M. Sondhi

Spatial Subsampling in Motion-Compensated Television Coders 1895
J. D. Robbins and A. N. Netravali

The Detection of Long Error Bursts During Transmission of Video Signals 1911
K. Janac and N. J. A. Sloane

Considerations for Single-Mode Fiber Systems 1919
K. Ogawa

Error Probability of Partial-Response Continuous-Phase Modulation With Coherent MSK-Type Receiver, Diversity, and Slow Rayleigh Fading in Gaussian Noise 1933
C.-E. Sundberg

Comparisons on Blocking Probabilities for Regular Series Parallel Channel Graphs 1965
D. Z. Du and F. K. Hwang

On the Physical Limits of Digital Optical Switching and Logic Elements 1975
P. W. Smith

An Inversion Technique for the Laplace Transform 1995
D. L. Jagerman

Approximate Mean Waiting Times in Transient GI/G/1 Queues 2003
D. L. Jagerman

An Analysis of the Carrier-Sense Multiple-Access Protocol 2023
D. P. Heyman

Implementing and Testing New Versions of a Good 48-Bit Pseudo-Random Number Generator 2053
C. S. Roberts

Some Extremal Markov Chains 2065
J. E. Mazo

Quality Evaluation Plan Using Adaptive Kalman Filtering 2081
M. S. Phadke

Contributors to This Issue 2109

Papers by Bell Laboratories Authors 2109

Contents, November Issue 2125

Errata 2127

November, Part 1

Feeder Planning Methods for Digital Loop Carrier 2129
B. Bulcha, L. E. Kodrich, D. B. Luber, W. J. Mitchell, M. A. Schwartz, and F. N. Woomer

Evaluation of Private Networks 2143
R. L. Kaufman and A. J. M. Kester

A Description of the Bell Laboratories Scanned Acoustic Microscope 2167
P. Sulewski, D. J. Bishop, and R. C. Dynes

A Statistical Model of Multipath Fading on a Space-Diversity Radio Channel 2185
W. D. Rummler

Matrix Analysis of Mildly Nonlinear, Multiple-Input, Multiple-Output Systems With Memory 2221
A. A. M. Saleh

Computing the Distribution of a Random Variable via Gaussian Quadrature Rules 2245
M. H. Meyers

A 9.6-kb/s DSP Speech Coder 2263
R. E. Crochiere, R. V. Cox, J. D. Johnston, and L. A. Seltzer

An Improved Model for Isolated Word Recognition 2289
J. M. Tribolet, L. R. Rabiner, and J. G. Wilpon

A Theoretical Model of Transient Heat Transfer in a Firestopped Cable Bundle 2313
P. B. Grimado

Planning and Conducting Field-Tracking Studies 2333
S. J. Amster, G. G. Brush, and B. Saperstein

Letter to the Editor 2365

Contributors to This Issue 2367

Papers by Bell Laboratories Authors 2373

Contents, December 1982 2381

November, Part 2

COMPUTING SCIENCE AND SYSTEMS

DATABASE SYSTEMS

Database Work at Bell Laboratories 2383
A. V. Aho

Structure of a Database File System for the *UNIX* Operating System 2387
M. J. Rochkind

Making *UNIX* Operating Systems Safe for Databases 2407
P. J. Weinberger

A Real-Time Database Management System for No. 5 ESS 2423
D. K. Barclay, E. R. Byrne, and F. K. Ng

Database Administration System—Architecture and Design Issues 2439
C. C. Wang and C. P. Huang

Implementation of a Distributed Database Management System to Support Logical Subnetworks 2459
D. Cohen

Design of a Prototype Videotex System 2475
N. H. Goguen

Human Factors in Data Access 2487
T. K. Landauer, S. T. Dumais, L. M. Gomez, and G. W. Furnas

Design and Implementation of a Production Database Management System 2511
T. C. Chiang and G. R. Rose

A Directed-Hypergraph Database: A Model for the Local Loop Telephone Plant 2529
A. J. Goldstein

Issues in the Design of a Distributed Record Management System 2555
J. P. Linderman

The Intelligent Store: A Content-Addressable Page Manager 2567
W. D. Roome

Abbreviations and Acronyms 2597

Contributors to This Issue 2599

November, Part 3

THE D4 DIGITAL CHANNEL BANK FAMILY

J. J. Lang, Guest Editor

Overview 2607
J. Chernak and J. J. Lang

The Channel Bank 2611
C. R. Crue, W. B. Gaunt, Jr., J. H. Green, J. E. Landry, and D. A. Spires

The Maintenance Bank 2665
R. E. Benjamin and H. H. Mahn

The *SLC*™-96 System 2677
Y-S. Cho, J. W. Olson, and D. H. Williamson

Dataport—Digital Access Through D4 2703
T. J. Aprille, S. Narayanan, P. G. St. Amand, and F. E. Weber

Dataport—Channel Units for Digital Data System Subrates 2721
T. J. Aprille, D. V. Gupta, and P. G. St. Amand

Dataport—Channel Units for Digital Data System 56-kb/s Rate 2741
B. J. Dunbar, D. V. Gupta, M. P. Horvath, R. E. Sheehey, and S. P. Verma

Digital Terminal Physical Design 2757
W. G. Albert, A. G. Favale, J. R. Hall, and D. H. Klockow

Custom-Integrated Circuits for Digital Terminals 2791
R. M. Goldstein, J. D. Leggett, G. L. Mowery, and K. F. Sodomsky

Thin-Film Dual Active Filter for Pulse Code Modulation Systems 2815
R. L. Adams, J. S. Fisher, O. G. Petersen, and I. G. Post

Acronyms and Abbreviations 2835

Contributors to This Issue 2839

December

An Overview of PANACEA, a Software Package for Analyzing Markovian Queueing Networks 2849
K. G. Ramakrishnan and D. Mitra

Special-Purpose Computer for Logic Simulation Using Distributed Processing 2873
Y. H. Levendel, P. R. Menon, and S. H. Patel

The Limit of the Blocking as Offered Load Decreases With Fixed Peakedness 2911
P. J. Burke

TV Bandwidth Compression Techniques Using Time-Companded Differentials and Their Applications to Satellite Transmissions 2917
K. Y. Eng and B. G. Haskell

Sensitivity of Avalanche Photodetector Receivers for Long-Wavelength Optical Communications 2929
R. G. Smith and S. R. Forrest

Transmitting Data on the Phase of Speech Signals 2947
W. C. Wong, R. Steele, and C. S. Xydeas

On the Use of Energy in LPC-Based Recognition of Isolated Words 2971
M. K. Brown and L. R. Rabiner

Isolated Word Recognition for Large Vocabularies 2989
L. R. Rabiner, A. E. Rosenberg, J. G. Wilpon, and W. J. Keilin

Multitone Frequency-Hopped MFSK System for Mobile Radio 3007
Uzi Timor

Design of Recovery Strategies for a Fault-Tolerant No. 4 Electronic Switching System 3019
R. J. Willett

Contributors to This Issue 3041

Papers by Bell Laboratories Authors 3047

Contents, January 1983 Issue 3051